

# BULLETIN

## OF THE INSTITUTE OF METALS

VOLUME 5

SEPTEMBER 1960

PART 13

### INSTITUTE NEWS

#### Informal Discussion on "Tube Production"

The Metallurgical Engineering Committee has arranged to hold an Informal Discussion on "Tube Production" in the lecture theatre of the College of Technology, Gosta Green, Birmingham 4, on Wednesday, 22 February 1961. It will be an all-day meeting at which there will be a discussion of the subject after the presentation of two opening addresses.

It is hoped to arrange for a buffet lunch at the College for the convenience of those attending.

#### Tercentenary Celebrations of the Royal Society

On the occasion of the Tercentenary Celebrations of the Royal Society, held in July, the Institute of Metals presented an Address of Congratulation worded as follows:

"We, the President, Council, and Members of the Institute of Metals, send to the President, Council, and Fellows of the Royal Society our greetings and warm congratulations on this Tercentenary Celebration of the Foundation of the Society.

"We recall with admiration the outstanding achievements of the Royal Society, both nationally and internationally, in the field of scientific endeavour and we pay tribute to the high standards that have been set by those eminent men and women who have been elected as Fellows and Foreign Members.

"We are confident that the Royal Society will in the future maintain the magnificent reputation that it has so justly earned in the past three hundred years."

The Address was signed on behalf of the Institute by the President (Sir Ronald Prain), who, with Lady Prain, attended the official opening of the celebrations by Her Majesty the Queen at the Royal Albert Hall on 19 July.

#### Subscriptions for 1960-61

Members are reminded that their subscriptions for 1960-61 became due on 1 September. Payment by Bankers' Order greatly facilitates the work of the Institute staff, and the Secretary will be glad to supply the necessary form on request.

#### West of England Metallurgical Society

The West of England Metallurgical Society has been accepted as an Associated Society of the Institute of Metals. Members of the Institute who are resident in the West of England, therefore, will be entitled to attend the meetings of the Society, details of which will be given in the omnibus programme that is circulated to members in the autumn of each year.

Mr. G. H. MOORE, Principal of the College of Technology, Bristol, has been elected President of the Society and the Chairman is Mr. E. R. GADD, Assistant Chief Engineer (Metallurgy), Bristol-Siddeley Engines, Ltd. Particulars of the Society may be obtained from the Secretary, Mr. PHILIP THORNTON, Lecturer in Metallurgy, College of Technology, Bristol.

#### The Beilby Medal and Prize, 1961

Since 1930, at intervals of one or more years, awards have been made by the Administrators of the Sir George Beilby Memorial Fund, representing the Royal Institute of Chemistry, the Society of Chemical Industry, and the Institute of Metals. Sir George Beilby had been President of each of these three bodies, and they jointly sponsored the appeal for subscriptions whereby the Fund was raised as a memorial to him after his death in 1925.

The awards are made to British investigators in science in recognition of independent original work of exceptional merit, carried out continuously over a period of years and involving the development and application of scientific principles in any field related to the special interests of Sir George Beilby, i.e. in chemical engineering, fuel technology or metallurgy, in their modern interpretations. The awards are intended as an encouragement to younger men and women (preferably under age 40) who have done distinguished work of practical significance in any of these fields.

In 1958 two awards, each of 150 guineas, were made. It was then agreed that no further award would be made before 1960.

The Administrators have decided that henceforth each award shall consist of a gold medal as well as a substantial sum of money, and shall be known as "The Beilby Medal and Prize" and specified as being "For Advancement in Science and Practice". Such an award will be offered at intervals of two years, but more than one may be made on the same occasion if there are several candidates of sufficiently outstanding merit.

Consideration will be given in due course to the making of an award (or awards) from the Fund in 1960. Outstanding work of the nature indicated may be brought to the notice of the Administrators, either by persons who desire to recommend the candidate or by the candidate himself, not later than 31 December 1960, by letter addressed to *The Convener of the Administrators, Sir George Beilby Memorial Fund, The Royal Institute of Chemistry, 30 Russell Square, London, W.C.1.*

The letter should be accompanied by *nine copies* of a short statement on the candidate's career (date of birth, education and experience, degrees and other qualifications, special



awards, &c., with dates) and of a list of titles, with references, of papers or other works published by the candidate, independently or jointly. Photographic copies of these documents are acceptable. Candidates are also advised to forward one reprint of each published paper of which copies are available.

### Lecture on "Deformation and Fracture of Ionic Crystals"

A General Meeting of the Institute was held at 17 Belgrave Square, London, S.W.1., on the evening of Wednesday, 27 April, when Dr. J. WASHBURN (Professor of Metallurgy in the University of California, Berkeley) lectured on "Deformation and Fracture of Ionic Crystals". The Chair was taken by Mr. H. W. G. HIGNETT, Vice-President of the Institute and Chairman of the Metal Physics Committee, under whose auspices the lecture was given.

The lecturer said that recent research activity on the mechanical properties of ionic and covalent materials had had two somewhat different origins. First, the realization that a refractory crystal such as magnesium oxide could exhibit considerable room-temperature ductility had aroused interest, and there was some reason to hope that non-metallic inorganic materials with useful mechanical properties might be developed. Secondly, some of these materials had proved to be ideally suited to the study of the dislocation mechanisms of deformation and fracture, as crystals of high structural perfection could be grown, containing only a few dislocations. Therefore, the properties of isolated dislocations could be studied at low magnification. X-ray microscopy and decoration techniques had provided new information about the origin of dislocations in annealed and as-grown crystals. Stress-induced multiplication during solidification appeared to play the most important role in forming the grown-in substructure. Etch-pit observations on highly perfect crystals of lithium fluoride constituted the first direct measurements of the properties of isolated dislocations. Growth of dislocation half loops into broad bands of slip had also been followed in lithium fluoride and magnesium oxide by etch-pit optical techniques. However, little direct evidence could be obtained concerning the dislocation multiplication mechanism.

Electron transmission microscopy of deformed magnesium oxide had now provided detailed information on the arrangement of dislocations within slip bands and on the behaviour of moving screw dislocations. The mechanism by which an isolated dislocation half loop grows into a wide band of slip had been clarified. An account of this work was to be published in the *Philosophical Magazine*.

Fracture in magnesium oxide frequently started at the intersection between slip bands growing on non-parallel slip planes. Electron transmission observations of slip-band intersections had revealed complex tangles of dislocations. The expected dislocation reaction:

$$\frac{a}{2} [110] + \frac{a}{2} [011] \longrightarrow \frac{a}{2} [101]$$

had been directly confirmed. However, it had not yet been possible to establish clearly the importance of any of the possible dislocation mechanisms of crack nucleation.

### Election of Members

The following 1 Overseas Sustaining Member, 21 Ordinary Members, 5 Junior Members, and 9 Student Members were elected on 20 July 1960:

#### As Overseas Sustaining Member

AMERICAN SMELTING AND REFINING COMPANY, South Plainfield, N.J., U.S.A.

#### As Ordinary Members

- ATKINSON, M., B.Sc., Metallurgy Research Department, The Steel Company of Wales, Ltd., Port Talbot, Glam.
- BERNARD, David, Chef du Service de Recherches Centrales et de Documentation, Compagnie Pechiney, Paris, France.
- BICKLEY, Alan Geoffrey, A.I.M., Development and Process Control Metallurgist, McKechnie Bros., Ltd., Aldridge, Staffs.
- FRANSEN, Hermann, Dr.phil., Geschäftsführender Gesellschafter der Metallband G.m.b.H., Krefeld, Germany.
- GIBBONS, Vincent J., B.Met.Eng., Managing Director, Lee Wilson Engineering Co. S.A., Fribourg, Switzerland.
- KAHN-REIN, Charles Anthony, Metallurgical Clerk, Ndola Copper Refineries, Ltd., Ndola, Northern Rhodesia.
- LEIGHLY, Hollis Philip, Jr., M.S., Ph.D., Assistant Professor of Metallurgy and Chairman, Department of Metallurgy, Denver Research Institute, Denver, Colo., U.S.A.
- LORD, Arthur Nelson, M.S., Ph.D., Physical Metallurgist, General Engineering Laboratory, General Electric Co., Schenectady, N.Y., U.S.A.
- LUERSEN, Frank Wonson, M.S., Chief Research Engineer, Refining and Physical Metallurgy, Research and Development Department, Inland Steel Co., E. Chicago, Ill., U.S.A.
- MCCARTHY, Michael Phillips, 37 Courtfield Gardens, Ealing, London, W.13.
- MARTIN GARCIA, José Thomas, Lic.en Cienc.Fis., Consejero Delegado, Ferro Aleaciones Españolas S.A., Madrid, Spain.
- MASSART, Joseph, Ing.civil., Ingénieur Principal, Solvay et Cie, Bruxelles, Belgium.
- RAMBAUD, J. B., L.ès Sci., Chef du Service Qualité, Société Métallurgique d'Imphy, Aciéries de Pamiers, Pamiers (Ariège), France.
- RICHARDSON, Gordon Dalyell, M.A., Principal Librarian, Public Library of New South Wales, Sydney, N.S.W., Australia.
- ROZNER, Alexander, Mech.Eng., M.Sc., Research Fellow, Department of Metallurgy, University of Notre Dame, Notre Dame, Ind., U.S.A.
- SAUVE, Charles Pierre Georges, L.ès Sci., Ing.civil Mines, Ingénieur, Centre d'Etudes Nucléaire de Saclay, Commissariat à l'Energie Atomique, Gif-sur-Yvette (S. et O.), France.
- SHNAY, Robert Charles, M.A.Sc., Manager, Research and Development, Canada Iron Foundries, Ltd., Toronto, Ont., Canada.
- SHYNE, John Cornelius, M.S.E., Ph.D., Project Director, Research Division, Mueller Brass Co., Port Huron, Mich., U.S.A.
- SKEVINGTON, Harry Clifton, A.I.M., A.M.I.W., Chief Metallurgist, Ashmore, Benson, Pease and Co., Ltd., Stockton-on-Tees.
- SWAMI, Nagaratnam Gopal, Dipl.-Ing., Superintendent of Training, Rourkela Steel Works, Rourkela, India.
- THOMAS, Ithel Orfryn Vivian, B.Sc., A.I.M., Senior Lecturer in Metallurgy, Flintshire Technical College, Connah's Quay, near Chester.



## PERSONAL NOTES

### *As Junior Members*

- FOULGER, Laurence John, L.I.M., Assistant to Works Metallurgist, Booth and Mapplebeck, Ltd., Winson Green, Birmingham.
- POWELL, John Henry, Technical Assistant, Imperial Chemical Industries, Ltd., Metals Division, Witton, Birmingham.
- WALUSZEWSKI, Andrzej, L.I.M., Process Metallurgist, 7 Leamington Road Villas, London, W.11.
- WHARTON, William Thomas, L.I.M., Metallurgical Assistant, McKechnie Bros., Ltd., Aldridge, Staffs.
- WILSON, Maurice George, Assistant Metallurgist, Manganese Bronze and Brass Co., Ltd., Ipswich.

### *As Student Members*

- CUNDILL, Robert Thomas, Undergraduate, Department of Metallurgy, University of Sheffield.
- DESFORGES, Charles Desmond, Undergraduate, Department of Metallurgy, University of Sheffield.
- FITZSIMMONS, Terence John, Metallurgical Laboratory Assistant, Aston Chain and Hook Co., Ltd., Erdington, Birmingham.
- HIGGINBOTHAM, Gordon John Spencer, B.A., Student, Department of Metallurgy, University of Cambridge.
- HOSE, Ronald Peter, Technical Assistant, Austral Bronze Co. Pty., Ltd., Glenorchy, Tasmania, Australia.
- MCLEOD, Donald Frank, Junior Metallurgist, The Delta Metal Co., Ltd., London.
- WELSTEAD, William, Undergraduate, Department of Metallurgy, University of Sheffield.
- YIM, Woongsoon Michael, M.S., Research Assistant, Department of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., U.S.A.
- YOGANANDAM, *Squadron Leader* Mulakala, B.Sc., A.F.R.Ac.S., Indian Air Force; temporarily at The College of Aeronautics, Cranfield.

## PERSONAL NOTES

DR. N. P. ALLEN, Superintendent of the Metallurgy Division, National Physical Laboratory, is President-Elect of the Institution of Metallurgists.

DR. D. V. ATTERTON has been elected a Member of Council of the Institute of British Foundrymen.

DR. G. L. J. BAILEY has relinquished his position as Superintendent of The Mond Nickel Company's Development and Research Laboratory in Birmingham and has transferred to London to become Manager of Research.

MR. I. A. BAILEY has been appointed Chairman and Chief Officer of The Mond Nickel Co., Ltd., and Henry Wiggin and Co., Ltd.

MR. R. C. BERTOSSA, Technical Director of Pyromet Co., San Carlos, Calif., has been appointed a Consulting Editor to *Metal Progress*.

MR. E. J. BRADBURY has been appointed Superintendent of The Mond Nickel Company's Development and Research Laboratory, Birmingham, in place of Dr. G. L. J. Bailey.

PROFESSOR DR. W. G. BURGERS, of the Technische Hogeschool, Delft, has been awarded the Heyn Memorial Medal of the Deutsche Gesellschaft für Metallkunde.

DR. J. A. COILEY has left the Atomic Energy Research Establishment, Harwell, and is now at Aeon Laboratories, Englefield Green, Surrey.

MR. E. G. COLEMAN has left the Armour Research Foundation and returned to full-time graduate study at the Carnegie Institute of Technology, Pittsburgh, Pa.

MR. D. J. CORDEROY has received an award under the Commonwealth Scholarship and Fellowship Plan and is to undertake research in physical metallurgy at Sheffield University.

M. ANDRÉ DUMAS, Directeur-Général of L'Aluminium Français, has been promoted to the grade of Officer of the Legion d'Honneur.

MR. R. FANNON has left Liquid Carbonic Canadian Corporation, Ltd., to return to the headquarters of the American parent company, General Dynamics Corporation, Liquid Carbonic Division, Chicago, Ill.

MR. V. C. FAULKNER has relinquished the Editorship of *Foundry Trade Journal*, a post he held for 40 years, and has been appointed Editorial Director.

MR. L. GRAINGER has been appointed Assistant Director of the Atomic Energy Research Establishment, Harwell, with special responsibility for applied research.

PROFESSOR A. G. GUY has left Purdue University and is now at the University of Florida, Gainesville, Fla.

MR. H. B. HEATON is now a Technical Officer in the Metallurgical Department of Blackburn Aircraft, Ltd., Brough, E. Yorks.

MR. H. W. G. HIGNETT has been appointed Managing Director of Henry Wiggin and Co., Ltd.

MR. J. O. HITCHCOCK has been appointed Managing Director of The Mond Nickel Co., Ltd., and Deputy Chairman of Henry Wiggin and Co., Ltd.

DR. J. C. HUDSON has retired from the staff of the British Iron and Steel Research Association, although he will continue to act as consultant to the Corrosion Advisory Bureau and the Chemistry Department.

MR. W. W. KEE has been appointed Managing Director of a new company, Alcan Enfield Alloys, Ltd., recently formed by Aluminium Limited of Canada and Enfield Rolling Mills, Ltd., to acquire the secondary aluminium smelter formerly operated by Enfield Rolling Mills (Aluminium), Ltd.

DR. J. W. MARTIN, Goldsmiths' Company Fellow in Metallurgy at Oxford, has been elected a Fellow of St. Catherine's College.

PROFESSOR RUPERT MYERS, Professor of Metallurgy and Head of the School of Metallurgy in the University of New South Wales, has been elected Federal Vice-President of the Australian Institute of Metals.

DR. R. B. NICHOLSON has been appointed a University Demonstrator in the Department of Metallurgy, Cambridge.

MR. A. R. PARKES has been appointed Editor of *Foundry Trade Journal* in succession to Mr. V. C. Faulkner. He had been Assistant Editor since 1947.



DR. L. B. PFEIL has been appointed Vice-Chairman of The Mond Nickel Co., Ltd.

MR. B. J. PEARCEY has left the University of Sheffield and taken up an appointment as metallographer with Hadfields, Ltd., Sheffield.

MR. B. E. PUGH has taken up a post with the South Wales Division of the Central Electricity Generating Board.

MR. C. F. ROBINS is now with Metallurgical Services, Betchworth, Surrey.

DR. PAUL SCHWARZKOPF, President of the Schwarzkopf Development Corporation, New York, and of Metallwerk Plansee, Reutte, Tyrol, was presented with a plaque at the International Powder Metallurgy Conference in June.

MR. R. O. SIMS has left The British Aluminium Co., Ltd., Falkirk, and is now with Reynolds T. I. Aluminium Co., Ltd., Resolven, Glam.

DR. L. M. WYATT, Chief Metallurgist of the Central Electricity Generating Board, has been appointed to the Research Board of the British Welding Research Association.

### Deaths

The Editor regrets to announce the deaths of:

MR. REGINALD CORBETT, of the English Electric Co., Ltd., Stafford, on 5 July 1960.

MR. GERALD MURRAY, Chief Metallurgist and Chemist of Pressed Steel Co., Ltd., Oxford, on 16 June, aged 49.

Mr. Murray joined the laboratory staff of Pressed Steel Co., Ltd., in December 1935 and was appointed Chief Metallurgist in 1943. He played an active part on many technical committees and was an authority on the subject of deep drawing and the sheet steel used for this purpose.

He was a member of the first Committee of the Oxford Local Section of the Institute of Metals and was Chairman of the Section from 1955 to 1957.

MR. JOHN ROLAND WILES, Chief Metallurgist of A. C. Wickman, Ltd., Coventry, on 20 June 1960.

## LETTER TO THE EDITOR

### Initiation of Microcracks as Indicated by the Electroplating Method

In an earlier communication (*J. Inst. Metals*, 1959-60, **88**, 319) the writer suggested that observation of the development of flecks in an electrodeposit of copper on a copper substrate subjected to fatigue stresses might reveal the behaviour of the substrate under such stresses. Further work has now indicated a relationship between the location of the flecks and the positions where fatigue microcracks develop in the substrate. Microscopical examination has shown that the slip bands developed in the region of the flecks are detectable in the substrate after the electrodeposit and a layer of 15  $\mu$  depth have been removed. These slip bands persist after deep electropolishing and have been correlated with actual cracks in the substrate.

H. SUZUKI.

*Department of Mechanical Engineering,  
Tohoku University,  
Sendai, Japan.*

## LOCAL SECTION NEWS

### Dr. J. P. Dennison

(Chairman, South Wales Local Section)

John Philip Dennison was born at Bradford, Yorks, in 1926 and educated at Heckmondwike Grammar School. He entered Leeds University in 1944 and graduated three years



later with a first-class Honours degree in metallurgy. As Yorkshire Copper Works Research Scholar, he then worked for two years under the late Professor A. Preece on the oxidation of copper alloys, obtaining a Ph.D. degree in 1949. In October of that year he was appointed Assistant Lecturer in Metallurgy at Leeds, but left in 1951 to take up his present position as Lecturer at University College, Swansea.

Dr. Dennison's research interests and publications have been concerned with oxidation, high-temperature corrosion, grain refinement, properties of precipitation-hardening copper-aluminium alloys, and creep. Work is at present going on at Swansea under his direction on tertiary creep and fracture.

Since 1949 Dr. Dennison has acted as consultant to Messrs. N. C. Ashton, Ltd., Huddersfield, in connection with copper-aluminium alloys. From 1954 until this year he was Secretary of the South Wales Local Section.

### Mr. E. G. V. Newman

(Chairman, London Local Section)

Ernest George Vincent Newman was born at Plumstead in 1914 and educated at St. Olave's and St. Saviour's School, Southwark, and the Royal School of Mines, London.

After spending a year in the foundry and new strip mill of I.C.I. Metals, Ltd., at Witton, he joined the staff of the Royal Mint in 1937. He is now Principal Scientific Officer and Senior Assayer, being concerned with the metallurgical aspects of all stages of the production of coins and medals in precious- and base-metal alloys.



Mr. Newman became a member of the Institute in 1937 and has served on the Committee of the London Local Section since 1948. He is also a Fellow of the Royal Institute of



Chemistry, a Fellow of the Institution of Metallurgists, and a Member of the Institution of Mining and Metallurgy.

## OTHER NEWS

### Dislocation Theory

A course of ten lectures on "Dislocation Theory" is to be given in the University of Liverpool by Dr. D. HULL (Lecturer in Metallurgy).

The course is designed for physicists and metallurgists with little or no preliminary knowledge of dislocation theory. The concept of a dislocation will be described, and then a detailed account of the properties of dislocations will be given. The course will include demonstrations of the methods used for observing dislocations, and in particular, direct observation in thin metal films in the electron microscope. The application of the theory will be illustrated by examples from the mechanical properties of metals.

The lectures will be given, from 5.30 to 7.0 p.m. on successive Mondays, beginning on 10 October 1960, in the Department of Metallurgy, University Main Building, Brownlow Hill, Liverpool. The fee for the course is £2 12s. 6d.

### College of Advanced Technology, Birmingham

Two post-graduate courses are being given in the Department of Metallurgy, College of Advanced Technology, Birmingham, during the Autumn term.

(1) A course of nine lectures on "Phase Transformations in the Solid State" on Tuesday evenings, beginning on 11 October (Tutor: Dr. T. Ll. Richards).

(2) A course of ten lectures on "Principles and Methods of Spectrographic Analysis of Metals" on Wednesday evening, beginning on 12 October (Tutor: Mr. J. B. Atkinson). In each course lectures will be given by specialists. The fee for each course is £2 5s. 0d. Further particulars and application forms may be obtained from the Bursar, College of Advanced Technology, Gosta Green, Birmingham 4.

### Special Courses at Borough Polytechnic

Three special courses of metallurgical interest are being held during the Winter term at the Borough Polytechnic, London, S.E.1:

- (1) "Recent Developments in Electrolytic Metal Finishing" (six lectures, 7-9 p.m. on Thursdays, beginning 6 October).
- (2) "Refractories: Their Manufacture, Properties, and Uses" (ten lectures, 7-9 p.m. on Fridays, beginning 7 October).
- (3) "Metallurgy of Semiconductors" (eight lectures, 7-9 p.m. on Tuesdays, beginning 25 October).

In addition, a special course on "Corrosion and Protection of Metals" will be held on one afternoon and one evening a week throughout the session (i.e. three terms), beginning on Monday, 26 September. At the end of the course, students will be able to sit for the Polytechnic Certificate Examination.

### Symposium on Nickel and Chromium Plating

The London Branch of the Institute of Metal Finishing is holding a Symposium on Nickel and Chromium Plating on 16 November 1960, at the Royal Festival Hall, London, S.E.1, when the following papers will be presented: "Developments in Nickel Plating", by H. C. Castell; "Recent Developments in Decorative Chromium Plating", by S. W. Baier; "Acceptance Requirements for Nickel/Chromium Plating", by W. G. L. Miller; "Meeting Acceptance Standards in Nickel/Chromium Plating", by D. J. Bouckley.

In connection with the Symposium it is proposed to organize an exhibition demonstrating proprietary nickel- and chromium-plating solutions and processes.

### Industrial Training in Operational Research

The British Iron and Steel Research Association announces the introduction of a graduate apprenticeship scheme for specialized training in operational research. The purpose of the scheme is to train recruits not only in the specialist techniques, but also in the practical art of applying these methods to actual industrial problems.

During the two-year course the apprentice will be regarded as a temporary member of BISRA staff at a salary of £700 per annum at the age of 21, with an extra £25 per annum for each year above that level. Training will consist of day-to-day experience as a member of a team engaged on actual problems in the steel industry followed by a more formal course in techniques, arranged in collaboration with the London School of Economics. The course will culminate in an examination for the Diploma in Operational Research recently instituted by the London School of Economics. The basic qualification for an apprentice is a good degree in a pure or applied science, mathematics, or statistics.

Further particulars, including an explanatory leaflet, can be obtained on application to BISRA's Personnel Officer, at 11 Park Lane, London, W.1.

### Symposium on Phase Transformations, Melbourne

A Symposium on "Phase Transformations in Metals and Alloys," sponsored by the Physical Metallurgy Division of the Melbourne Branch, Australian Institute of Metals, will be held at the University of Melbourne Engineering School on



## DIARY

10 and 11 November, 1960. Thirteen papers will be presented, which have been published in the August 1960 issue of the *Journal of the Australian Institute of Metals*.

The papers are: "The Mechanism of Martensite Transformations", by D. G. Walker and D. Borland; "The Crystallography of Martensite Transformations", by J. K. Mackenzie; "Crystallographic Aspects of the Bainite Transformation", by J. S. Bowles and N. Kennon; "A Super-Elastic Alloy Based on the Martensite Transformation", by W. A. Rachinger; "Effect of Small Chromium Contents on the Isothermal Transformation Rates of Steel Wire", by G. G. Brown and H. C. Coe; "The Secondary Hardening and the Volume Change Occurring in the Fourth Stage of Tempering of Alloy Steels", by Tomo-o Sato, Hideo Kaneko, and Taiju Nishizawa; "Phase Transformations Accompanying the Formation of *AB* Superlattices", by J. S. Bowles and A. S. Malin; "Phase Transformations in Titanium and Titanium Alloys", by I. Lamborn; "The *M<sub>s</sub>* Points of Titanium Binary Alloys", by Tomo-o Sato, Seikiti Hukai, and Yen-Chien Huang; "The Effects of Alloying Elements on the  $\alpha \rightarrow \beta$  Transformation in the Transition Metals", by H. W. Worner; "Proposed Transformations in Pure Chromium", by A. R. Edwards; "Irradiation-Induced Phase Changes in Alloys", by R. Smith; and "Nucleation and Growth of Gas Bubbles in Irradiated Materials", by B. S. Hickman.

### Robert Horne Memorial Lecture

The Fourth Robert Horne Memorial Lecture of the Society of Chemical Industry will be by Professor F. D. RICHARDSON, D.Sc., Ph.D., M.I.M.M. (Royal School of Mines), entitled "The Extraction of Metals and the Chemistry of Metals" and will be delivered in the lecture theatre of the Chemistry Department of the University of Bristol, Woodland Road, Bristol 8, at 6.30 p.m. on Thursday, 29 September 1960. All interested persons are welcome to attend.

## DIARY

- 21 September. **North East Metallurgical Society.** "Trends in Instrumental Methods of Metallurgical Analysis", by W. E. Elwell. (Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough, at 7.30 p.m.)
- 22 September. **Scottish Local Section.** Visit to Works of Messrs. Anderson Boyes, Ltd., Motherwell.
- 4 October. **Oxford Local Section.** "Dilute Solutions in Metals and Alloys", by Professor F. D. Richardson. (Cadena Café, Cornmarket Street, Oxford, at 7.15 p.m.)
- 6 October. **London Local Section.** Chairman's Address: "Sovereigns Good and Bad", by E. G. V. Newman. (17 Belgrave Square, London, S.W.1, at 6.30 p.m.)
- 6 October. **Sheffield Local Section.** Film Evening. (Applied Science Building of the University, St. George's Square, Sheffield 1, at 7.30 p.m.)

- 10 October. **Scottish Local Section.** "Aluminium Alloys in Shipbuilding", by F. St. M. Brierly and J. E. Tomlinson. (Institution of Engineers and Shipbuilders, Elmbank Crescent, Glasgow, C.2, at 6.30 p.m.)
- 11 October. **South Wales Local Section.** "The Use of Aluminium Alloys in Transport", by H. S. Stubbs. (Metallurgy Department, University College, Singleton Park, Swansea, at 6.30 p.m.)
- 12 October. **Manchester Metallurgical Society.** Presidential Address, by A. B. Ashton. (Manchester Literary and Philosophical Society, George Street, Manchester, at 6.30 p.m.)
- 13 October. **Birmingham Local Section.** "Semi-Conductors", by J. G. Wilkes. (College of Technology, Gosta Green, Birmingham 4, at 6.30 p.m.)
- 13 October. **East Midlands Metallurgical Society.** "Recent Developments in Metallurgical Studies of Fatigue", by P. J. E. Forsyth. (Derby and District College of Art, Derby, at 7.30 p.m.)
- 13 October. **Liverpool Metallurgical Society.** Presidential Address, by R. Cobill. (Department of Metallurgy, University of Liverpool, at 7.0 p.m.)
- 13 October. **West of England Metallurgical Society.** "Some Factors Concerned in the Failure of Metals", by Dr. L. E. Benson. (College of Technology, Ashley Down, Bristol 7, at 7.30 p.m.)
- 17 October. **London Local Section.** "Electroplating Processes and Effect on Fatigue Strength and Embrittlement of the Substrate", by C. Williams. Joint meeting with the London Branch of the Institute of Metal Finishing. (Northampton Polytechnic, St. John Street, London, E.C.1, at 6.15 p.m.)

## APPOINTMENTS VACANT

**EXPERIENCED METALLURGIST** for senior position in Research and Development Laboratory of large light-alloy firm in Midlands with wide and expanding interests. The position offers real scope for the right man. Write in confidence, giving full details of age, experience, and qualifications, to Box No. 457, The Institute of Metals, 17 Belgrave Square, London, S.W.1.

**METALLURGIST** with University Degree or equivalent required for research and development work on metal-arc welding. Experience of welding not essential, although advantageous. Excellent working facilities and conditions, good salary and prospects. Apply in writing to Research Manager, Murex Welding Processes, Ltd., Waltham Cross, Herts.

### UNIVERSITY OF MELBOURNE

#### Senior Demonstrator in Engineering Materials

Applications are invited for the above-mentioned position in the Metallurgy School. Applicants should hold a degree in science or engineering and should be capable of planning and supervising practical exercises which are devoted to the study of materials on the basis of solid-state physics and chemistry.

The salary will be in the range £A1400-1600. A tourist-class fare will be paid for an appointee from outside Victoria.

Applications should be lodged with the Registrar, University of Melbourne, Parkville, N.2, Victoria, Australia, not later than 30 September, 1960.

F. H. JOHNSTON,  
Registrar.